



Herbaceous Perennials—Container Overwintering and Hardiness

Dr. Leonard Perry, Extension Professor

Types of coverings

- poly/straw sandwich (12in. straw between layers of white poly) provides best protection for tender species, least temperature fluctuation
- few differences in survival for many species among fleece (felt overwintering blanket) combinations with or without white poly, and from poly/straw sandwich
- no apparent difference if plants on soil or black ground cloth when covered
- some species prone to rot best overwintered in hoop houses

Types of coverings—by zone

- zones 3-4: poly/straw sandwich, 2-3 layers microfoam/fleece, 2 layer hoop house heated or fleece
- zones 5-6: one layer microfoam/fleece, 2 layer hoop house unheated, one layer hoop house heated, heated coldframes
- zones 7-8: evergreen boughs/straw or similar, one layer remay or similar, coldframe

Covering/uncovering

- Cover as late as possible before snow (mid-Nov north, mid-Dec south), although this is not as crucial as uncovering as soon as possible in spring (early April north, early March south)
- Cut back to 2-4" prior to covering; use mouse bait if potential/known problem; use fungicides sparingly

Soil/pot temperatures

- Roots of more tender perennials injured in high 20s
- **Soil:** much residual heat, just 2" of snow/mulch can moderate especially in fall and spring cycling, by 5-10°F
- USDA zone 4, 2" depth, 32°F around Christmas, below first of year, mid to high 20s, seldom to low 20s then only for few days
- **Pots:** often follow air temperatures closely; if small or space around, within a day; if large or tight, several days; benefit from residual ground heat if not on fabric; even 2" snow or mulch moderates as with soil

Cultivars and species, controlled freezing (CF) studies

- Will vary with many factors, but can compare relative hardiness under similar conditions (see lists)
- If a plant is not hardy at a CF temperature, it is likely not hardy in the field at that temperature
- If a plant is hardy at a CF temperature, it may not be hardy in the field at that temperature due to variables

Date of freezing

Plants are not hardened by early fall, some may be hardened sufficiently by Nov. (depends on fall acclimation variables), most maximum hardiness by Dec. or Jan.; plant may die at 32°F in Sept but survive 7°F or less Jan.

Freezing duration

- Longer the duration at a low temperature, the more likely the harmful effect
- May see more effect from 2hrs, 24hrs, 48 hrs or more at low temperatures than higher; depends on species

Cycling temperatures

- Often cycling between $-3/+3^{\circ}\text{C}$ (26/38 $^{\circ}\text{F}$) results in more hardiness than holding at constant -3°C
- For hardy perennials, cycling may have no benefit.
- For less hardy, more than one cycle may be detrimental.
- Injury is likely with less hardy when cycling occurs late winter or early spring.
- More injury may occur at wide cycling such as $-8/+8^{\circ}\text{C}$ (18/47 $^{\circ}\text{F}$)
- Duration at each temperature up to 3 days is not as crucial as the temperature

Acclimation (fall before covered or moved inside, winter prior to freezing)

- Outdoor exposure to low temperatures and cycling, prior to covering, is currently being studied
- Fall cool prior to controlled non-freezing may harden less hardy; more hardy may benefit from less cool and warmer non-freezing temperatures.
- Holding below freezing (-2°C , 28 $^{\circ}\text{F}$) for more than 2 days prior to lower temperatures, may be harmful

Rate of thawing

In general the more rapidly plants are brought from colder below freezing temperatures to above freezing after a severe freezing episode, the less damage and better regrowth; keeping plants at colder temperatures for longer seems to cause more injury than the rapid increase in temperature; depending on pot size, above freezing temperature, and time below freezing, pots may take 3 days to thaw at 4°C (40 $^{\circ}\text{F}$)\

Established (older) vs new plants

Often new, more vigorous plants (divisions, plugs) are more hardy than rootbound older plants, but this seems to vary with species, and studies continue

Moisture effects

Although preliminary studies with a few species shows no difference in survival, moisture may affect survival on select species (field and grower observations) and will be studied further.

Fertility effects

- Increased nitrogen (N) levels at least to 300ppm applied weekly from 20-10-20, and until mid Oct., result in increased growth before and after freezing
- Slow release fertilizer may result in increased growth and hardiness, with studies underway
- Increased fertility levels and liquid fertilization into the fall, in general has little or no effect on hardiness, and in fact may make plants more hardy (unpublished studies, Quebec)
- This differs from woody plants due to the quite different nature of hardiness of perennials
-

More information on these studies, and updates, can be found at Perry's Perennial Pages

(<http://www.uvm.edu/~pass/perry/>) under the Research and Professional Industry sections. More on this topic can be found described in the book Herbaceous Perennial Production, available from NRAES (www.nraes.org)